

Susquehanna Steam Electric Station
Medical Services Drill
After Action Report/
Improvement Plan

Drill Date – May 24, 2017

Radiological Emergency Preparedness (REP) Program



FEMA

Published June 26, 2017

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EXECUTIVE SUMMARY

On May 24, 2017 a Medical Services Drill was evaluated in relation to the Susquehanna Steam Electric Station (SSES) Emergency Planning Zone (EPZ) by the Federal Emergency Management Agency (FEMA), Region III, Radiological Emergency Preparedness Program (REPP). The purpose of the drill was to assess the level of State and local preparedness in responding to a possibly radiation contaminated injured individual. The drill was held in accordance with Department of Homeland Security policies and guidance concerning the exercise of State and local radiological emergency response plans (RERPs) and procedures. The most recent previous FEMA evaluated Medical Services Drill for this commercial nuclear power plant was conducted on April 20, 2017, at Geisinger-Wyoming Valley Medical Center, Wilkes-Barre, PA.

FEMA, Region III, wishes to acknowledge the efforts of the many individuals in the Commonwealth of Pennsylvania, the risk jurisdiction of Columbia County, the Greater Columbia Medical Transport Service, and Geisinger-Bloomsburg Hospital which participated in this drill. Protecting the public health and safety is the full-time job of some of the drill participants and an additional assigned responsibility for others. Still others have willingly sought this responsibility by volunteering to provide vital emergency services to their communities. Cooperation and teamwork of all the participants were evident during this drill.

This report contains the final evaluation of the Medical Services Drill. The Commonwealth of Pennsylvania and local organizations demonstrated knowledge of their emergency response plans and procedures and adequately implemented them. There were no Level 1 or Level 2 Findings or Plan Issues as a result of this Drill.

SECTION 1: EXERCISE OVERVIEW

1.1 Exercise Details

Exercise Name

2017 SSES-Geisinger Bloomsburg Hospital Medical Services Drill

Type of Exercise

Medical Services Drill

Exercise Date

May 24, 2017

Program

Department of Homeland Security/FEMA Radiological Emergency Preparedness Program

Scenario Type

Radiologically Contaminated Injured Individual

1.2 Exercise Planning Team Leadership

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1.3 Participating Organizations

Agencies and organizations of the following jurisdictions participated in the exercise:

State Jurisdictions

Pennsylvania Emergency Management Agency (not evaluated)

Risk Jurisdictions

Columbia County Emergency Management Agency (not evaluated)

Geisinger Bloomsburg Hospital

Greater Columbia Medical Transport

Support Jurisdictions

None

Private Organizations

Susquehanna Steam Electric Station (not evaluated)

Federal Organizations

Federal Emergency Management Agency (not evaluated)

SECTION 2: EXERCISE DESIGN SUMMARY

2.1 Exercise Purpose and Design

On December 7, 1979, the President directed the Federal Emergency Management Agency (FEMA) to assume the lead responsibility for all off-site radiological planning and response. FEMA's activities were conducted pursuant to 44 Code of Federal Regulations (CFR) Parts 350, 351 and 352. These regulations are a key element in the Radiological Emergency Preparedness (REP) Program that was established following the TMI accident in March 1979.

44 CFR 350 establishes the policies and procedures for FEMA's initial and continued approval of State and local governments' radiological emergency planning and preparedness for commercial nuclear power plants. This approval is contingent, in part, on State and local government participation in joint exercises with licensees. FEMA's responsibilities in radiological emergency planning for fixed nuclear facilities include the following:

- A. Taking the lead in offsite emergency planning and in the review and evaluation of radiological emergency response plans and procedures developed by State and local governments;
- B. Determining whether such plans and procedures can be implemented on the basis of observation and evaluation of exercises of the plans and procedures conducted by State and local governments;
- C. Responding to requests by the U.S. Nuclear Regulatory Commission (NRC) pursuant to the Memorandum of Understanding between the NRC and FEMA dated December 7, 2015 (Federal Register, Vol. 81, No. 57, March 24, 2016) and;
- D. Coordinating the activities of the following Federal agencies with responsibilities in the radiological emergency planning process:
 - U.S. Department of Commerce
 - U.S. Nuclear Regulatory Commission
 - U.S. Environmental Protection Agency
 - U.S. Department of Energy
 - U.S. Department of Health and Human Services
 - U.S. Department of Transportation
 - U.S. Department of Agriculture
 - U.S. Department of the Interior
 - U.S. Food and Drug Administration

Representatives of these agencies serve on the Region III Regional Assistance Committee (RAC), which is chaired by FEMA. A Radiological Emergency Preparedness Medical Services Drill was conducted on May 24, 2017, to assess the capabilities of State and local emergency preparedness organizations in implementing their radiological emergency response plans and procedures to protect the public health and safety during a radiological emergency involving TMI.

The purpose of this After Action Report is to present the Drill results and findings on the performance of the Off-site Response Organizations (OROs) during a simulated radiological emergency involving a contaminated injured individual.

The Drill was designed to demonstrate and evaluate the responders' knowledge of patient and responder personal protective measures, equipment preparation and employment, and decontamination procedures. All activities were demonstrated in accordance with the participants' plans and procedures as they would be performed in an actual emergency, except as agreed to in the Extent-of-Play Agreement.

The findings presented in this report are based on the evaluations of the Federal evaluator team, with final determinations made by the FEMA Region III Regional Assistance Committee (RAC) Chairperson and approved by FEMA Headquarters. These reports are provided to the NRC and participating States. State and local governments utilize the findings contained in these reports for the purposes of planning, training, and improving emergency response capabilities.

- Section 1 of this report, entitled Overview, presents the Exercise Planning Team and the Participating Organizations.
- Section 2 of this report, entitled Design Summary, and includes the Purpose and Design, Objectives, Capabilities, and Activities, and the Scenario Summary.
- Section 3 of this report entitled Analysis of Capabilities contains detailed Evaluation and Results; a Summary Results of Evaluation; and Criteria Evaluation Summary. Information on the demonstration for each jurisdiction or functional entity evaluated is presented in a jurisdiction-based, issue-only format.
- Section 4 of this report entitled Conclusion, is a description of FEMA's overall assessment of the capabilities of the participating organizations.

The criteria utilized in the FEMA evaluation process are contained in the following:

- NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980;
- Radiological Emergency Preparedness Program Manual, January 2016

2.2 Exercise Objectives, Capabilities and Activities

The 2017 SSES/Bloomsburg Geisinger Hospital Medical Services Drill evaluated by FEMA, was designed to demonstrate that the ORO can transport, transfer, monitor, decontaminate and treat a contaminated/injured person while minimizing any cross contamination during a radiological emergency.

The demonstration included the ability to:

- A. Respond to a radiation medical emergency following Columbia County Emergency Management Agency, Geisinger-Bloomsburg Hospital, and Greater Columbia Medical Transport procedures.
- B. Monitor for radiation contamination and uptake, and to validate persons providing these services are adequately prepared to handle contaminated individuals.

- C. Conduct timely and accurate communications between the hospital and offsite response agencies.
- D. Exhibit correct priorities and appropriate techniques in Emergency Medical Services (EMS); transportation of patients; and pre-hospital and hospital emergency care of radioactively contaminated patients.
- E. Demonstrate inter-agency cooperation between the Ambulance Service/EMS and the hospital.

2.3 Scenario Summary

The exercise scenario for this Medical Services Drill consisted of simulated notifications of escalating emergency classification levels at Susquehanna Steam Electric Station from Site Area Emergency to General Emergency. State and local governments concurred on a protective action to evacuate the Emergency Planning Zone.

Subsequent to being notified of the General Emergency, the 911 Center informed the hospital that an incident had occurred at a decontamination center resulting in the injury and possible radiological contamination of a civilian evacuee. The hospital implemented its plan to prepare a Radiation Emergency Area to receive and treat the patient and activated its radiation emergency medical team.

An evacuee was found walking by the roadway near the incident and transported to a Monitoring and Decontamination Center by a "good Samaritan." The driver was later monitored and found not contaminated. The victim had bruising and a laceration to the forehead and cuts and abrasions on both hands. However, the patient was not monitored for contamination because the center was not operational yet. An ambulance was dispatched to the Monitoring and Decontamination Center.

Upon arrival at the scene, gross decontamination was implemented at the Monitoring and Decontamination Center, by paramedics, by simulating removal of outer clothing. The patient was assessed, prepared for transport, and evacuated to the hospital by ambulance. At the hospital, personnel established an outdoor receiving area and an indoor Emergency Radiation Area ERA. The patient was received by emergency department staff and monitored for radioactive contamination, decontaminated, and treated for minor injuries.

SECTION 3: ANALYSIS OF CAPABILITIES

3.1 Exercise Evaluation and Results

Contained in this section are the results and findings of the evaluations of all jurisdictions and locations that participated in the May 24, 2017, SSES/Geisinger-Bloomsburg Hospital Medical Services Drill. The Drill was conducted to demonstrate the ability of the OROs to respond to a potentially contaminated injured person associated with Susquehanna Steam Electric Station.

Each jurisdiction and functional entity was evaluated on the basis of its demonstration of the appropriate Demonstration Criteria contained in the REP Program Manual. Detailed information on the Demonstration Criteria and the Extent-of-Play Agreement are found in Appendix B.

The Drill was conducted and evaluated in accordance with the Radiological Emergency Preparedness Program Manual (January 2016) and NUREG-0654/FEMA-REP-1, Rev. 1. The Demonstration Criteria included:

1.e.1 - Equipment, maps, displays, monitoring instruments, dosimetry, potassium iodide (KI) and other supplies are sufficient to support emergency operations.

3.a.1 - The OROs issue appropriate dosimetry, KI, and procedures, and manage radiological exposure to emergency workers in accordance with the plans/procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. OROs maintain appropriate record-keeping of the administration of KI to emergency workers.

6.d.1 - The facility/ORO has the appropriate space, adequate resources, and trained personnel to provide transport, monitoring, decontamination, and medical services to contaminated injured individuals.

3.2 Summary Results of Exercise Evaluation

The matrix presented in Table 3.1, on page 13, presents the status of the Demonstration Criteria from the REP Program Manual that were scheduled for demonstration during this Drill by all participating jurisdictions and functional entities. Drill Demonstration Criteria are listed by number and the demonstration status of the criteria is indicated by the use of the following letters:

(L1) Level 1 Finding: An observed or identified inadequacy of organizational performance in an exercise that could cause a determination that offsite emergency preparedness is not adequate to provide reasonable assurance that appropriate protective measures can be taken in event of a radiological emergency to protect the health and safety of the public living in the vicinity of a Nuclear Power Plant (NPP).

(L2) Level 2 Finding: An observed or identified inadequacy of organizational performance in an exercise that is not considered, by itself, to adversely impact public health and safety.

(P) Plan Issue: An observed or identified inadequacy in the off-site response organizations' emergency plan/implementing procedures, rather than that of the ORO's performance.

(N) Not Demonstrated: The term applied to the status of a REP Evaluation Area Criterion indicating that the ORO, for a justifiable reason, did not demonstrate the Evaluation Area Criterion, as required in the Extent-of-Play Agreement or at the two-year or eight-year interval required in the FEMA REP Program Manual.

(M) Met: The status of a REP Evaluation Area Criterion indicating that the participating ORO demonstrated all demonstration criteria for the Evaluation Area Criterion to the level required in the Extent-of-Play Agreement with no findings assessed in the current exercise and no unresolved prior findings.

Table 3.1 - Summary of Exercise Evaluation

Date: 2017-04-20 Site: Susquehanna Steam Electric Station, PA M: Met, L1: Level1, L2: Level2, P: Plan Issue, N: Not Evaluated	Criterion	Geisinger-Bloomsburg Hospital	Greater Columbia Medical Transport
Emergency Operations Management			
Mobilization	1.a.1	N	N
Facilities	1.b.1	N	N
Direction and Control	1.c.1	N	N
Communications	1.d.1	N	N
Equipment and Supplies to Support Operations	1.e.1	M	M
Protective Action Decision Making			
Emergency Worker Exposure Control	2.a.a	N	N
Radiological Assessment and PARs	2.b.1	N	N
Decisions for the Plume Phase PADs	2.b.2	N	N
PADs for Protection of Special Populations	2.c.1	N	N
Rad Assessment and Decision Making for Ingestion Pathway	2.d.1	N	N
Rad Assessment and Decision Making concerning Relocation, Reentry, and Return	2.e.1	N	N
Protective Action Implementation			
Implementation of Emergency Worker Exposure Control	3.a.1	M	M
Implementation of KI Decision	3.b.1	N	N
Implantation of Protective Actions for Special Populations – EOCs	3.c.1	N	N
Implantation of Protective Actions for Schools	3.c.2	N	N
Implementation of Traffic and Access Control	3.d.1	N	N
Impediments to Evacuation are Identified and Resolved	3.d.2	N	N
Implementation of Ingestion Pathway Decisions – Availability/Use of Information	3.e.1	N	N
Materials for Ingestion Pathway PADs are Available	3.e.2	N	N
Implementation of Relocation, Reentry, and Return Decisions	3.f.1	N	N
Field Measurement and Analysis			
(Reserved)	4.a.1	N	N
Field Team Management	4.a.2	N	N
Field Teams Obtain Sufficient Information	4.a.3	N	N
Field Team Sampling	4.b.1	N	N
Laboratory Analysis	4.c.1	N	N
Emergency Notification and Information			
Activation of the Prompt Alert and Notification Network	5.a.1	N	N
(Reserved)	5.a.2	N	N
Activation of Backup Alert and Notification Systems	5.a.3	N	N
Exception Area Alert and Notification	5.a.4	N	N
Emergency Information and Instructions for the Public and the Media	5.b.1	N	N
Support Operations/Facilities			
Registration and Monitoring/Decontamination of Evacuees	6.a.1	N	N
Monitoring/Decontamination of Emergency Workers, Equipment, and Vehicles	6.b.1	N	N
Temporary Care of Evacuees	6.c.1	N	N
Transportation and Treatment of Contaminated Injured Individuals	6.d.1	M	M

3.3 Criteria Evaluation Summaries

3.3.1 State Jurisdictions

No State Jurisdictions were evaluated.

3.3.2 Risk Jurisdictions

3.3.2.1 Columbia County, Geisinger-Bloomsburg Hospital

In summary, the status of DHS/FEMA criteria for the Risk jurisdiction is as follows:

- a. MET: 1.e.1, 3.a.1, 6.d.1
- b. LEVEL 1 FINDINGS: NONE
- c. LEVEL 2 FINDINGS: NONE
- d. PLAN ISSUES: NONE
- e. PRIOR ISSUES – RESOLVED: NONE
- f. PRIOR ISSUES – UNRESOLVED: NONE

3.3.2.2 Columbia County, Greater Columbia Medical Transport Ambulance

In summary, the status of DHS/FEMA criteria for the Risk jurisdiction is as follows:

- a. MET: 1.e.1, 3.a.1, 6.d.1
- b. LEVEL 1 FINDINGS: NONE
- c. LEVEL 2 FINDINGS: NONE
- d. PLAN ISSUES: NONE
- e. PRIOR ISSUES – RESOLVED: NONE
- f. PRIOR ISSUES – UNRESOLVED: NONE

3.3.3 Support Jurisdictions

No Support Jurisdictions were evaluated.

3.3.4 Private Organizations

No Private Jurisdictions were evaluated.

3.3.5 Federal Jurisdictions

No Federal Jurisdictions were evaluated.

SECTION 4: CONCLUSION

The Commonwealth of Pennsylvania and private sector organizations, except where noted in this report, demonstrated knowledge of their radiological emergency response plans and procedures and they were successfully implemented during the 2017 SSES/Geisinger-Bloomsburg Hospital Medical Services Drill.

Two FEMA evaluators provided analyses of six evaluation criteria. These analyses resulted in a determination of no Findings, no new Plan Issues, and no unresolved Plan Issues.

The Greater Columbia Medical Transport Service successfully demonstrated that necessary equipment and supplies were available to support the treatment of an injured/contaminated patient. Emergency Medical Service (EMS) personnel prioritized life-saving medical practices over contamination concerns, implemented protective measures through the use of Personal Protective Equipment, regular glove changes, and control of cross contamination. Appropriate patient assessments were demonstrated as well as regular and ongoing communications with Geisinger-Bloomsburg.

The Geisinger-Bloomsburg Hospital successfully demonstrated the mobilization of staff, staffing assignments, issue of dosimetry and monitoring equipment, and effective use of Personal Protective Equipment during the exercise. The hospital staff effectively responded to communications from the Greater Columbia Medical Transport team, initiated the set-up and management of a Radiation Emergency Area, and accepted and successfully treated an injured/contaminated patient while administering life-saving medical attention over contamination concerns. In addition, the medical facility provided security control of the facility including the drop off bay for the patient and overall protective measures for contamination control and prevention of cross contamination.

Based on the results of the Drill and a review of the offsite radiological emergency response plans and procedures submitted, FEMA Region III has determined they are adequate (meet the planning and preparedness standards of NUREG-0654/FEMA-REP-1, Revision 1, November 1980, as referenced in 44 CFR 350.5) and there is reasonable assurance they can be implemented, as demonstrated during this Drill.

An Improvement Plan (IP) will not be developed as part of this report.

APPENDIX A: EXERCISE EVALUATORS AND TEAM LEADERS

DATE: 4/20/2017, SITE: Susquehanna Steam Electric Station

LOCATION	TEAM LEADER	EVALUATOR	AGENCY
Columbia County, Geisinger-Bloomsburg Hospital	Barton Freeman	Michael Shuler	FEMA
Columbia County, Greater Columbia Medical Transport	Barton Freeman	Barton Freeman	FEMA

APPENDIX B: ACRONYMS AND ABBREVIATIONS

Acronym	Description
cpm	Counts Per Minute
DHS	Department of Homeland Security
EMA	Emergency Management Agency
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
FEMA	Federal Emergency Management Agency
GWVMC	Geisinger-Wyoming Valley Medical Center
KI	Potassium Iodide
NCA	Nanticoke Community Ambulance
PEMA	Pennsylvania Emergency Management Agency
REPMAN	Radiological Emergency Preparedness Program Manual
RERP	Radiological Emergency Response Plan
SAE	Site Area Emergency
SSSES	Susquehanna Steam Electric Station

APPENDIX C: EXTENT OF PLAY

The enclosed Extent of Play was created as an overall tool for facilitation and implementation of the 2017 SSES Geisinger-Bloomsburg Hospital Medical Services Drill and to integrate the concepts and policies of the Homeland Security Exercise Evaluation Program with the Radiological Emergency Preparedness Program Exercise Methodology.

The "Susquehanna Steam Electric Station/Geisinger-Bloomsburg Hospital 2017 Medical Services Drill Extent of Play" was agreed upon by FEMA Region III, PEMA, and the emergency management agencies of the participants.

For the purposes of this report, the terms exercise and drill are synonymous.

**SUSQUEHANNA STEAM ELECTRIC STATION
BLOOMSBURG HOSPITAL EXERCISE
May 24, 2017**

Method of Operation

1. The power station and its personnel will not play an active role in the facilitation of this exercise. The plant's simulated events, radiation releases, and emergency classifications will be injected by off-site Controllers. A pre-approved scenario will be used.
2. The Pennsylvania Emergency Management Agency (PEMA), Area Office (Central Area) will not be activated as part of this drill. The Exercise Coordinator will provide pre-exercise coordination and observe exercise activities.
3. PEMA Central Area Office will participate as a Controller in this exercise.
4. Columbia County Emergency Management Agency will participate in this exercise.
5. Controllers will be supplied by PEMA. Controllers are not players and will provide injects and information to initiate and stimulate drill play by providing radiological readings during the monitoring of personnel. Live radioactive sources will only be used to perform operational checks of radiological monitoring instruments.
6. PEMA staff and qualified county emergency management personnel will be assigned to key locations for the purpose of observing, noting response actions and conditions, and recording observations for future use. Observers will not take an active part in the proceedings, but will interact with staff members to the extent necessary to fulfill their observer responsibilities. Coaching of players is not permitted, except as appropriate to provide training to participants awaiting a re-demonstration.
7. Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), Radiological Emergency Preparedness Program (REPP) Evaluators: FEMA Evaluators will be present at designated demonstration locations.
8. Exercise activities are scheduled to commence on or about 8:00 a.m., May 24, 2017 and continue until the participants have completed the exercise objectives and demonstrated the Exercise Evaluation Criteria.
9. Participants and agencies will Stand Down when the Controllers have confirmed with the Evaluators that all evaluation criteria have been demonstrated and when the State and County Observers are satisfied that the Objectives have been met.
10. An emergency plan is drafted to address the generally expected conditions of an emergency. Not everything in the emergency plan may be applicable for a given scenario. The main purpose of an emergency plan is to assemble sufficient expertise and officials so as to properly react to the events as they occur. The responders should not be so tied to a plan that they cannot take actions that are more protective of the public. Therefore, if, by not following the plan, the

responders protect the public equally, as well as provided in the plan, it should be noted for possible modification of the plan, but not classified as a negative incident. Furthermore, if, by following the plan there is a failure to protect the public health and safety, it should be noted so that the plan can be modified and the appropriate negative assessment corrected.

11. During the exercise any activity that is not satisfactorily demonstrated may be re-demonstrated by the participants during the exercise, provided it does not negatively interfere with the exercise. Refresher training may be provided by the players, observers, and/or Controllers. Evaluators are not permitted to provide refresher training. Re-demonstrations will be negotiated between the Players, Observers, Controllers, and Evaluators. PEMA may advise the Regional Assistance Committee Chair prior to initiating any re-demonstrations. It is permissible to extend the demonstration window, within reason, to accommodate the re-demonstration. Activities corrected from a re-demonstration will be so noted.

Objectives

- A. Demonstrate the ability to respond to a radiation medical emergency following the procedures of Columbia County Emergency Management Agency, Greater Columbia Medical Transport Service, and Bloomsburg Hospital.
- B. Demonstrate timely and accurate communications between the hospital and offsite response agencies. (Telephones will be used in lieu of radios whenever possible to limit the potential misinterpretation of the exercise as an actual event.)
- C. Demonstrate correct priorities and appropriate techniques in EMS, transportation of patients, and pre-hospital and hospital emergency care of radioactively contaminated patients.
- D. Demonstrate inter-agency cooperation between the ambulance company/EMS and the hospital.

Extent of Play

Evaluation Area 1—Emergency Operations Management Sub-Element 1.e—Equipment and Supplies to Support Operations

Intent

This sub-element is derived from NUREG-0654/FEMA-REP-1, which requires that Offsite Response Organizations (ORO) have emergency equipment and supplies adequate to support the emergency response.

Criterion 1.e.1: Equipment, maps, displays, monitoring instruments, dosimetry, potassium iodide (KI), and other supplies are sufficient to support emergency operations. (NUREG-0654/FEMA-REP-1, H.7, 10; I.7, 8, 9; J.10.a, b, e, J.11, 12; K.3.a; K.5.b).

Assessment/Extent of Play

Assessment of this Demonstration Criterion is accomplished primarily through a baseline evaluation and subsequent periodic inspections.

A particular facility's equipment and supplies must be sufficient and consistent with that facility's assigned role in the ORO's emergency operations plans. Use of maps and other displays is encouraged. For non-facility based operations, the equipment and supplies must be sufficient and consistent with the assigned operational role. At locations where traffic and access control personnel are deployed, appropriate equipment (e.g., vehicles, barriers, traffic cones, and signs) must be available, or their availability described.

Specific equipment and supplies that must be demonstrated under this criterion include KI inventories, dosimetry, and monitoring equipment, as follows:

KI: Responsible OROs must demonstrate the capability to maintain inventories of KI sufficient for use by: (1) emergency workers; (2) institutionalized individuals, as indicated in capacity lists for facilities; and (3) where stipulated by the plans/procedures, members of the general public (including transients) within the plume pathway EPZ. In addition, OROs must demonstrate provisions to make KI available to specialized response teams (e.g., civil support team, Special Weapons and Tactics Teams, urban search and rescue, bomb squads, HAZMAT, or other ancillary groups) as identified in plans/procedures). The plans/procedures must include the forms to be used for documenting emergency worker ingestion of KI, as well as a mechanism for identifying emergency workers that have declined KI in advance. Consider carefully the placement of emergency workers that have declined KI in advance.

ORO quantities of dosimetry and KI available and storage location(s) will be confirmed by physical inspection at the storage location(s) or through documentation of current inventory submitted during the exercise, provided in the ALC submission, and/or verified during an SAV. Available supplies of KI must be within the expiration date indicated on KI bottles or blister packs. As an alternative, the ORO may produce a letter from a certified private or State

laboratory indicating that the KI supply remains potent, in accordance with U.S. Pharmacopoeia standards.

Dosimetry: Sufficient quantities of appropriate direct-reading and permanent record dosimetry and dosimeter chargers must be available for issuance to all emergency workers who will be dispatched to perform an ORO mission. In addition, OROs must demonstrate provisions to make dosimetry available to specialized response teams (e.g., civil support team, Special Weapons and Tactics Teams, urban search and rescue, bomb squads, HAZMAT, or other ancillary groups) as identified in plans/procedures.

Appropriate direct-reading dosimetry must allow an individual(s) to read the administrative reporting limits and maximum exposure limits contained in the ORO's plans/procedures.

Direct-reading dosimeters must be zeroed or operationally checked prior to issuance. The dosimeters must be inspected for electrical leakage at least annually and replaced when necessary. Civil Defense Victoreen Model 138s (CD V-138s) (0-200 mR), due to their documented history of electrical leakage problems, must be inspected for electrical leakage at least quarterly and replaced when necessary. This leakage testing will be verified during the exercise, through documentation submitted in the ALC and/or through an SAV.

Operational checks and testing of electronic dosimeters must be in accordance with the manufacturer's instructions and be verified during the exercise, through documentation submitted in the ALC and/or through an SAV.

Monitoring Instruments: All instruments must be inspected, inventoried, and operationally checked before each use. Instruments must be calibrated in accordance with the manufacturer's recommendations. Unmodified CDV-700 series instruments and other instruments without a manufacturer's recommendation must be calibrated annually. Modified CDV-700 instruments must be calibrated in accordance with the recommendation of the modification manufacturer. A label indicating such calibration must be on each instrument or calibrated frequency can be verified by other means. In addition, instruments being used to measure activity must have a sticker-affixed to their sides indicating the effective range of the readings. The range of readings documentation specifies the acceptable range of readings that the meter should indicate when it is response-checked using a standard test source.

For FMTs, the instruments must be capable of measuring gamma exposure rates and detecting beta radiation. These instruments must be capable of measuring a range of activity and exposure, including radiological protection/exposure control of team members and detection of activity on air sample collection media, consistent with the intended use of the instrument and the ORO's plans/procedures. An appropriate radioactive check source must be used to verify proper operational response for each low-range radiation measurement instrument (less than 1R/hr) and for high-range instruments when available. If a source is not available for a high-range instrument, a procedure must exist to operationally test the instrument before entering an area where only a high-range instrument can make useful readings.

In areas where portal monitors are used, the OROs must set up and operationally check the monitor(s). The monitor(s) must conform to the standards set forth in the *Contamination Monitoring Standard for a Portal Monitor Used for Emergency Response*, FEMA-REP-21 (March 1995) or in accordance with the manufacturer's recommendations.

Mutual Aid Resources: If the incoming resources arrive with their own equipment (i.e., monitors and/or dosimetry), they will be evaluated by REP Program standards. FEMA will not inventory equipment that is not part of the REP Program. If an agency has a defined role in the REP Plan, they are subject to the planning process and standards, as well as the guidance of this Manual.

All activities must be based on the ORO's plans/procedures and completed as they would be in an actual emergency, unless noted above or otherwise specified in the Extent-of-Play Agreement.

State Negotiated Extent of Play:

Ambulance crews are not trained or equipped to operate or carry radiological monitoring equipment. In accordance with PEMA SOP Annex E, Appendix 5 "Radiological Exposure Control" (March 2002), ambulance crews operating outside the 10 mile Emergency Planning Zone are considered "Category C" emergency workers; therefore, they are only required to implement protective measures consistent with protection against blood-borne pathogens; i.e., long sleeved garments, trousers, impermeable gloves, and surgical masks. "Category C" emergency worker dosimetry issue consists of one permanent reading dosimeter per worker. Ambulance crews are provided additional dosimetry if they are tasked with entering the 10-mile EPZ.

Hospital personnel are also considered "Category C" emergency workers and will conform to PEMA SOP protective measures at minimum. Direct Reading Dosimeters may be issued individually; however, an Area Kit will be established in the Radiation Emergency Area (REA). Individual PRDs will be issued by the hospital. Radiological Survey Instruments are calibrated per manufactures recommendations.

Outstanding Issues:

None

Evaluation Area 3—Protective Action Implementation

Sub-Element 3.a—Implementation of Emergency Worker Exposure Control

Intent

This Sub-element is derived from NUREG0654/FEMA-REP-1, which requires that OROs have the capability to provide for the following: distribution, use, collection, and processing of direct-reading dosimetry and permanent record dosimetry; reading of direct-reading dosimetry by emergency workers at appropriate frequencies; maintaining a radiation dose record for each emergency worker; establishing a decision chain or authorization procedure for emergency workers to incur radiation exposures in excess of the PAGs, and the capability to provide KI for emergency workers, always applying the “as low as is reasonably achievable” principle as appropriate.

Criterion 3.a.1: The OROs issue appropriate dosimetry, KI, and procedures, and manage radiological exposure to emergency workers in accordance with the plans/procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. OROs maintain appropriate record-keeping of the administration of KI to emergency workers. (NUREG-0654/FEMA-REP-1, K.3.a, b; K.4)

Assessment/Extent of Play

Assessment of this Demonstration Criterion may be accomplished during a biennial or tabletop exercise. Other means may include drills, seminars or training activities that would fully demonstrate technical proficiency.

OROs must demonstrate the capability to provide emergency workers (including supplemental resources) with the appropriate direct-reading and permanent record dosimetry, dosimeter chargers, KI, and instructions on the use of these items. For evaluation purposes, appropriate direct-reading dosimetry is defined as dosimetry that allows an individual(s) to read the administrative reporting limits that are pre-established at a level low enough to consider subsequent calculation of TEDE and maximum exposure limits, for those emergency workers involved in lifesaving activities, contained in the ORO's plans/procedures.

Each emergency worker must have basic knowledge of radiation exposure limits as specified in the ORO's plans/procedures. If supplemental resources are used, they must be provided with just-in-time training to ensure basic knowledge of radiation exposure control. Emergency workers must demonstrate procedures to monitor and record dosimeter readings and manage radiological exposure control.

During a plume phase exercise, emergency workers must demonstrate the procedures to be followed when administrative exposure limits and turn-back values are reached. The emergency worker must report accumulated exposures during the exercise as indicated in the plans/procedures. OROs must demonstrate the actions described in the plans/procedures by determining whether to replace the worker, authorize the worker to incur additional exposures, or

take other actions. If exercise play does not require emergency workers to seek authorizations for additional exposure, evaluators must interview at least two workers to determine their knowledge of whom to contact in case authorization is needed, and at what exposure levels. Workers may use any available resources (e.g., written procedures and/or co-workers) in providing responses.

Although it is desirable for all emergency workers to each have a direct-reading dosimeter, there may be situations where team members will be in close proximity to each other during the entire mission. In such cases, adequate control of exposure can be achieved for all team members using one direct-reading dosimeter worn by the team leader. Emergency workers assigned to low-exposure rate fixed facilities (e.g., EOCs and communications center within the EPZ, reception centers, and counting laboratories) may have individual direct-reading dosimeters or they may be monitored using group dosimetry (i.e., direct-reading dosimeters strategically placed in the work area). Each team member must still have his or her own permanent record dosimetry. Individuals authorized by the ORO to re-enter an evacuated area during the plume (emergency) phase, must be limited to the lowest radiological exposure commensurate with completing their missions.

OROs may have administrative limits lower than EPA- 400-R-92-001 dose limits for emergency workers performing various services (e.g., lifesaving, protection of valuable property, all activities). OROs must ensure that the process used to seek authorization for exceeding dose limits does not negatively impact the capability to respond to an incident where lifesaving and/or protection of valuable property may require an urgent response.

OROs must demonstrate the capability to accomplish distribution of KI to emergency workers consistent with decisions made. OROs must have the capability to develop and maintain lists of emergency workers who have ingested KI, including documentation of the date(s) and time(s) they did so. Ingestion of KI recommended by the designated ORO health official is voluntary. For evaluation purposes, the actual ingestion of KI shall not be performed. OROs must demonstrate the capability to formulate and disseminate instructions on using KI for those advised to take it. Emergency workers must demonstrate basic knowledge of procedures for using KI whether or not the scenario drives the implementation of KI use. This can be accomplished by an interview with the evaluator.

All activities must be based on the ORO's plans/procedures and completed as they would be in an actual emergency, unless noted above or otherwise specified in the Extent-of- Play Agreement.

State Negotiated Extent of Play:

- *Demonstrate appropriate procedures and equipment to manage radiological exposure to staff.*
- *Demonstrate the ability to transport contaminated/injured individuals while using ALARA principles.*
- *Demonstrate the ability to utilize dosimetry, equipment and procedures to manage radiological exposure to emergency workers as required by plans.*

Radiological briefings will be provided to address exposure limits and procedures to replace personnel approaching limits and how permission to exceed limits is obtained. At any time, players may ask other players or supervisors to clarify radiological information. In Pennsylvania, emergency workers outside the EPZ do not have turn-back values. Standard issue of dosimetry and potassium iodide for each category of emergency worker is as follows:

Category A: 1 PRD, 1 DRD, and 1 unit of KI

Category B: 1 PRD and 1 unit of KI

Category C: 1 PRD

All locations that have dosimetry equipment indicated within their Radiological Emergency Response Plan (RERP) will make the dosimetry equipment (and KI, as appropriate) available for inspection by the Federal Evaluator. Simulation PRDs with mock serial numbers may be used.

Outstanding Issues:

None

Evaluation Area 6—Support Operation/Facilities

Sub-Element 6.d—Transportation and Treatment of Contaminated Injured Individuals

Intent

This Sub-element is derived from NUREG0654/FEMA-REP-1, which requires that OROs have the capability to transport contaminated injured individuals to medical facilities with the capability to provide medical services.

Criterion 6.d.1: The facility/ORO has the appropriate space, adequate resources, and trained personnel to provide transport, monitoring, decontamination, and medical services to contaminated injured individuals.

(NUREG0654/FEMA-REP-1, F.2; H.10; K.5.a, b; L.1, 4)

Assessment/Extent of Play

Assessment of this Demonstration Criterion may be accomplished during a biennial exercise, an actual event, or drills. FEMA has determined that these capabilities have been enhanced and consistently demonstrated as adequate; therefore, offsite medical services drills need only be evaluated biennially. FEMA will, at the request of the ORO, continue to evaluate the drills on an annual basis. All hospitals listed in the plan as medical services hospitals must be evaluated, with a transportation provider, every 2 years. Additional transportation providers will be rotated through the drills in the 8-year exercise cycle. For the ambulance providers who do not participate in an evaluated drill during the two year cycle, training will be provided. This training will be documented in the ALC.

Monitoring, decontamination, and contamination control efforts must not delay urgent medical care for the victim.

ORO must demonstrate the capability to monitor/decontaminate and transport contaminated injured individuals to medical facilities.

An ambulance must be used for response to the victim. However, to avoid taking an ambulance out of service for an extended time, OROs may use any vehicle (e.g., car, truck, or van) to transport the victim to the medical facility. It is allowable for an ambulance to demonstrate up to the point of departure for the medical facility and then have a non-specialized vehicle transport the "victim(s)" to the medical facility. This option is used in areas where removing an ambulance from service to drive a great distance (over an hour) for a drill would not be in the best interests of the community.

Normal communications between the ambulance/dispatcher and the receiving medical facility must be demonstrated. If a substitute vehicle is used for transport to the medical facility, this communication must occur before releasing the ambulance from the drill. This communication would include reporting radiation monitoring results, if available. In addition, the ambulance crew must demonstrate, by interview, knowledge of where the ambulance and crew would be monitored and decontaminated, if required, or whom to contact for such information.

Monitoring of the victim may be performed before transport or en route, or may be deferred to the medical facility. Contaminated injured individuals transported to medical facilities are monitored as soon as possible to assure that everyone (ambulance and medical facility) is aware of the medical and radiological status of the individual(s). However, if an ambulance defers monitoring to the medical facility, then the ambulance crew presumes that the patient(s) is contaminated and demonstrate appropriate contamination controls until the patient(s) is monitored. Before using monitoring instruments, the monitor(s) must demonstrate the process of checking the instrument(s) for proper operation. All monitoring activities must be completed as they would be in an actual emergency. Appropriate contamination control measures must be demonstrated before and during transport and at the receiving medical facility.

The medical facility must demonstrate the capability to activate and set up a radiological emergency area for treatment. Medical facilities are expected to have at least one trained physician and one trained nurse to perform and supervise treatment of contaminated injured individuals. Equipment and supplies must be available for treatment of contaminated injured individuals.

The medical facility must demonstrate the capability to make decisions on the need for decontamination of the individual, follow appropriate decontamination procedures, and maintain records of all survey measurements and samples taken. All procedures for collection and analysis of samples and decontamination of the individual must be demonstrated or described to the evaluator. Waste water from decontamination operations must be handled according to facility plans/procedures.

All activities must be based on the ORO's plans/procedures and completed as they would be in an actual emergency, unless noted above or otherwise specified in the Extent-of- Play Agreement.

State Negotiated Extent of Play:

- *Demonstrate that the facility has the appropriate space, adequate resources and trained personnel to provide monitoring, decontamination and medical services to contaminated/injured individuals.*
- *Demonstrate the ability to transport contaminated/injured individuals while using ALARA principles.*

Greater Columbia Medical Transport Service will pick-up a pre-staged simulated contaminated/injured victim.

Outstanding Issues:

None

MEDICAL SERVICES EXERCISE

May 24, 2017

EXERCISE SUMMARY

The purpose of this exercise is to demonstrate the capabilities of the emergency response organizations in Columbia County in handling contaminated/injured persons and to satisfy both the hospital's requirement for an emergency/drill and the "Medical Services Guidance Memorandum MS-1."

PARTICIPANTS

Bloomsburg Hospital
Greater Columbia Medical Transport Service

CONTROLLERS

Pennsylvania Emergency Management Agency (PEMA)
PEMA Central Area Office
Columbia County Emergency Management Agency

EVALUATORS

Federal Emergency Management Agency

OBSERVERS

Pennsylvania Emergency Management Agency
Columbia County Emergency Management Agency
Talen Energy

OBJECTIVES

- E. Demonstrate the ability to respond to a radiation medical emergency following the procedures of Columbia County Emergency Management Agency, Greater Columbia Medical Transport Service and Bloomsburg Hospital.
- F. Demonstrate timely and accurate communications between the hospital and offsite response agencies. (Telephones will be used in lieu of radios whenever possible to limit the potential misinterpretation of the exercise as an actual event.)
- G. Demonstrate correct priorities and appropriate techniques in EMS, transportation of patients and pre-hospital and hospital emergency care of radioactively contaminated patients.
- D. Demonstrate inter-agency cooperation between the Ambulance Company/EMS and the Hospital.

AMBULANCE COMPANY

- 1. Criterion 1.e.1: Equipment, maps, displays, monitoring instruments, dosimetry, potassium iodide (KI), and other supplies are sufficient to support emergency operations. (NUREG-0654 / FEMA-REP-1, H.7, 10; I.7, 8, 9; J.10.a, b, e, J.11, 12; K.3.a; K.5.b).
- 2. Criterion 3.a.1: The OROs issue appropriate dosimetry, KI, and procedures, and manage radiological exposure to emergency workers in accordance with the plans / procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. OROs maintain appropriate record-keeping of the administration of KI to emergency workers. (NUREG-0654 / FEMA-REP-1, K.3.a, b; K.4)
- 3. Criterion 6.d.1: The facility / ORO has the appropriate space, adequate resources, and trained personnel to provide transport, monitoring, decontamination, and medical services to contaminated injured individuals. (NUREG0654 / FEMA-REP-1, F.2; H.10; K.5.a, b; L.1, 4)

HOSPITAL

- 1. Criterion 1.e.1: Equipment, maps, displays, monitoring instruments, dosimetry, potassium iodide (KI), and other supplies are sufficient to support emergency operations. (NUREG-0654 / FEMA-REP-1, H.7, 10; I.7, 8, 9; J.10.a, b, e, J.11, 12; K.3.a; K.5.b).
- 2. Criterion 3.a.1: The OROs issue appropriate dosimetry, KI, and procedures, and manage radiological exposure to emergency workers in accordance with the plans / procedures. Emergency workers periodically and at the end of each mission read their dosimeters and record the readings on the appropriate exposure record or chart. OROs maintain appropriate record-keeping of the administration of KI to emergency workers. (NUREG-0654 / FEMA-REP-1, K.3.a, b; K.4)

3. Criterion 6.d.1: The facility/ORO has the appropriate space, adequate resources, and trained personnel to provide transport, monitoring, decontamination, and medical services to contaminated injured individuals.

(NUREG0654/FEMA-REP-1, F.2; H.10; K.5.a, b; L.1, 4).

NOTE: The Bloomsburg Hospital Radiological Emergency Response Plan assigns radiological monitoring of the patient to the Hospital.

NOTE: Monitoring of ambulance personnel and vehicle is the responsibility of the Hospital, if available, and the monitoring decontamination center if the hospital is not available.

NOTE: Players will be pre-staged for the start of the exercise.

SCHEDULE OF EVENTS

Greater Columbia Transport Service

- 9:00 AM Exercise begins.
- 9:00 AM Ambulance Company is notified that the Susquehanna Steam Electric Station has declared a Site Area Emergency.
- 9:10 AM Ambulance Company is notified that Susquehanna Steam Electric Station has escalated to a General Emergency.
- 9:15 AM An ambulance is requested to report to the accident staging area to pick up an injured and potentially contaminated individual. **(Simulated-At Greater Columbia Medical Transport Service, see page 7)**
- * 10:00 AM Ambulance leaves for Bloomsburg Hospital and notifies the hospital they are bringing in an injured potentially contaminated person for treatment. **AMBULANCE WILL RESPOND WITHOUT SIRENS AND LIGHTS.**
- * 10:15 AM Ambulance arrives at the hospital and the patient is removed from the ambulance.
- * 10:30 AM Hospital staff takes control of the contaminated/injured person. Ambulance and crew are monitored before being released.
- * 10:40 AM Exercise ends for ambulance crew.

Geisinger-Bloomsburg Hospital

- 9:00 AM Exercise begins.
- 9:00 AM The hospital is notified that Susquehanna Steam Electric Station has declared a Site Area Emergency.
- 9:10 AM The hospital is notified that the emergency at the Susquehanna Steam Electric Station has escalated to a General Emergency.
- *10:00 AM The hospital is notified that the ambulance is enroute with an injured potentially contaminated person.
- *10:15 AM The patient arrives at the hospital.
- *11:15 AM Exercise Ends; Critique immediately following.

*Times may vary. Starting time is subject to change.

SCENARIO

- 9:00 AM The Emergency Room Charge Nurse at Bloomsburg Hospital is notified that Susquehanna Steam Electric Station has declared a Site Area Emergency.
- 9:00 AM Ambulance Company is notified that Susquehanna Steam Electric Station has declared a Site Area Emergency.
- 9:10 AM Bloomsburg Hospital is notified that the emergency at Susquehanna Steam Electric Station has escalated to a General Emergency.
- 9:10 AM Ambulance Company is notified that the emergency at Susquehanna Steam Electric Station has escalated to a General Emergency.
- 9:15 AM Ambulance Company is requested to report to the accident staging area **(At Greater Columbia Medical Transport Service, see page 7)** to pick up an injured patient. The patient is conscious and is potentially contaminated.
- *10:00 AM Ambulance leaves for the Bloomsburg Hospital and notifies the hospital they are en route with an injured potentially contaminated person.
- *10:15 AM Ambulance arrives at hospital.
- *10:30 AM Hospital staff takes control of the contaminated/injured person. Ambulance and crew are monitored before being released.
- *11:05 AM After the patient is stabilized and decontaminated, clean-up of the Emergency Room area begins (clean-up is explained rather than demonstrated).
- *11:15 AM Exercise Ends; Critique immediately following.

*Time listed is variable and subject to change

CONTROLLER PROMPTS

- 9:00 AM **Columbia County Controller** provides notification to the Ambulance Company that the plant has declared a Site Area Emergency.
- 9:10 AM **Columbia County Controller** provides notification to the Ambulance Company that the plant has declared a General Emergency.
- 9:15 AM **Columbia County Controller** provides notification to the Ambulance Company that a person has been injured; the extent of injuries is not known at this time, but it is known the patient is possibly contaminated. The injured is at the accident staging area (Simulated location is at Greater Columbia Transport Service, see page 7).
- 10:00 AM **Ambulance Controller** releases the ambulance to leave for Bloomsburg Hospital at this time. Caution the driver not to use his emergency lights or siren. Ambulance should obey all traffic regulations in transit.

Note: The County Dispatch Center will make notifications to the hospital and ambulance

NOTE: Precede and conclude all transmissions with

"THIS IS AN EXERCISE"

-
- 9:00 AM **Columbia County Controller** notifies the ER Charge Nurse that the plant has declared a Site Area Emergency.
- 9:10 AM **Columbia County Controller** notifies the Hospital that the plant has declared a General Emergency. Inform the Hospital they may be receiving potentially contaminated individuals.
- 10:15 AM* **Hospital Controller** will provide contamination reading injects accordingly.

* Time listed is variable and subject to change.

NOTE: Please begin and end all telephone conversations with

"THIS IS AN EXERCISE"

CONTROLLER ASSIGNMENTS

Communications	Columbia County EMA via Columbia County 911 Center 570-389-5720
Ambulance	Pennsylvania Emergency Management Agency Central Area Office 717-514-9056 (cell) Eugene Sajeski 717-651-7065
Hospital	Pennsylvania Emergency Management Agency Tony Mull 717-649-0253 (cell) 717-651-2735 (off)

TELEPHONE NUMBERS AND ACTION LOCATION ADDRESSES

Bloomsburg Hospital	549 Fair Street Bloomsburg, PA 17815 570-387-2100
Greater Columbia Medical Transport Service	475 W 8 ½ Street Bloomsburg, PA 17815 570-389-0618
Columbia County Emergency Management Agency	P.O. Box 380 R. 26 West First Street Bloomsburg, PA 17815 570-389-5720

PLEASE BEGIN AND END ALL TELEPHONE CONVERSATIONS WITH
 "THIS IS A DRILL"

ATTACHMENT 1

INJURED PERSON DATA

Situation: The Susquehanna Steam Electric Station declared a General Emergency and an evacuation was ordered. An evacuee was found walking by the roadway near the incident and transported to the Mon/Decon center by a Good Samaritan who was later monitored and found not contaminated.

Injuries: The victim has bruising and a laceration to his forehead and cuts and abrasions on both hands.

Blood Pressure: 140/70

Pulse: 95

Breathing: 22

Temperature: Normal

Skin: Pale

Nausea: No

Vision: Clear, eyes equal and reactive

Patient may give own answer on all other queries.

Contamination:

- A. There are contamination readings of 800 cpm on the right palm. After first decontamination attempt, the readings fall down to 600 cpm. After the second attempt, the readings fall to background reading.
- B. There are contamination readings of 600 cpm to the forehead laceration. After first decontamination attempt, the readings fall to 400 cpm. After the second attempt, the readings fall to background reading.

NOTE: EMS should cut away outer clothing (**explained**) as a method of gross decontamination. This will eliminate a substantial amount of any contamination. If survey meters are not available, EMS should assume they are handling a potentially contaminated patient.

ATTACHMENT 2

CONTAMINATION IS INDICATED IN YELLOW AND INJURY INDICATED IN RED BELOW

Initial reading- 600
cpm.

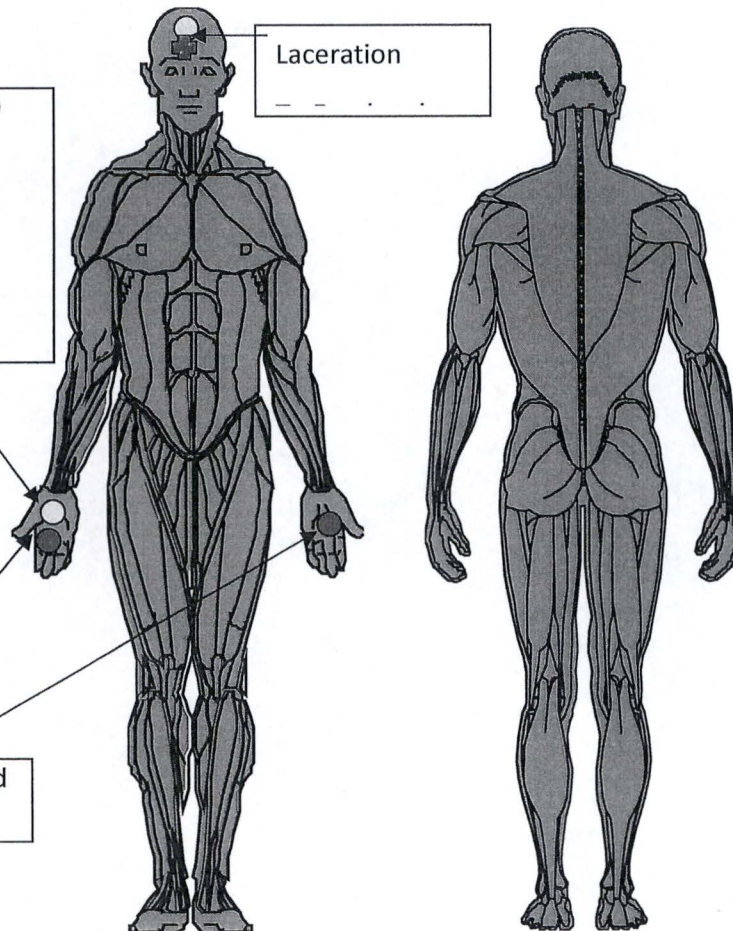
-1st - 400 cpm

Initial reading - 800
cpm on right palm.

-1st - 600 cpm
-2nd - background

Laceration

Abrasions on right and
left palms.



- A. Contamination readings of 800 cpm on right palm. First decontamination attempt decreases readings to 600 cpm on right palm. Second attempt results in background reading.
- B. Contamination readings of 600 cpm on forehead laceration. First decontamination attempt decreases to 400 cpm. Second attempt results in background reading.

The Hospital Controller will give follow-on injects based on satisfactory decontamination demonstrations.

**Gross decontamination should be accomplished at the scene.
Readings will become lower after successful decontamination.
Evaluator may ask questions as the exercise progresses.**

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